

The Role of AI in Hospitals and Clinics: Transforming Healthcare in the 21st Century

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Abstract

As healthcare systems around the world face challenges such as escalating costs, limited access, and growing demand for personalized care, artificial intelligence (AI) is emerging as a key force for transformation. This review is motivated by the urgent need to harness AI's potential to mitigate these issues and aims to critically assess AI's integration in different healthcare domains. We explore how AI empowers clinical decision-making, optimizes hospital operation and management, refines medical image analysis, and revolutionizes patient care and monitoring through AI-powered wearables. Through several case studies, we review how AI has transformed specific healthcare domains and discuss the remaining challenges and possible solutions. Additionally, we will discuss methodologies for assessing AI healthcare solutions, ethical challenges of AI deployment, and the importance of data privacy and bias mitigation for responsible technology use. By presenting a critical assessment of AI's transformative potential, this review equips researchers with a deeper understanding of AI's current and future impact on healthcare. It encourages an interdisciplinary dialogue between researchers, clinicians, and technologists to navigate the complexities of AI implementation, fostering the development of AI-driven solutions that prioritize ethical standards, equity, and a patient-centered approach.